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(54) Title: METHODS AND COMPOSITIONS FOR CHEMICAL MECHANICAL POLISHING SUBSTRATES COVERED
WITH AT LEAST TWO DIELECTRIC MATERIALS

(57) Abstract: Methods and compositions are provided for planarizing a substrate surface with reduced or minimal defects in surface topography. In one aspect, a method is provided for processing a substrate including positioning a substrate comprising at least first dielectric material and second dielectric material disposed thereon in a polishing apparatus, polishing the substrate with a first polishing composition having a first selectivity, and polishing the substrate with a second polishing composition having a second selectivity greater than the first selectivity.



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A. CLASSIFICATION OF SUBJECT MATTER IPC 7 H01L21/3105 H01L21/768 C09G1/02 B24B37/04		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 H01L		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the International search (name of data base and, where practical, search terms used) EPO-Internal, PAJ		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 46081 A (STRASBAUGH) 16 September 1999 (1999-09-16) the whole document	1-3, 11-14, 16-18, 21-24, 27-42
X	WO 00 02235 A (STRASBAUGH) 13 January 2000 (2000-01-13) the whole document	1-3, 11-14, 16-18, 21-24, 27-42
X	US 5 395 801 A (DOAN TRUNG T ET AL) 7 March 1995 (1995-03-07) the whole document -/-	1-5,7, 16-18
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents : 'A' document defining the general state of the art which is not considered to be of particular relevance 'E' earlier document but published on or after the international filing date 'L' document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) 'O' document referring to an oral disclosure, use, exhibition or other means 'P' document published prior to the international filing date but later than the priority date claimed 'T' later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention 'X' document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone 'Y' document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. '&' document member of the same patent family		
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Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer Szarowski, A

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 02/22587

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 114 249 A (CANAPERI DONALD FRANCIS ET AL) 5 September 2000 (2000-09-05) the whole document ---	1-4,7,8
X	EP 1 068 928 A (APPLIED MATERIALS INC) 17 January 2001 (2001-01-17) the whole document ---	16-18, 22-24, 35-42
X	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 06, 22 September 2000 (2000-09-22) & JP 2000 068371 A (MITSUBISHI ELECTRIC CORP), 3 March 2000 (2000-03-03) abstract ---	1-3
A	EP 1 061 111 A (SHOWA DENKO KK) 20 December 2000 (2000-12-20) the whole document ---	
A	US 5 981 394 A (KATO TUYOSHI ET AL) 9 November 1999 (1999-11-09) column 7 -column 8 column 11 ---	
A	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 09, 13 October 2000 (2000-10-13) & JP 2000 156360 A (FUJITSU LTD;FUJITSU VLSI LTD), 6 June 2000 (2000-06-06) abstract ---	
P,A	-& US 2001/036738 A1 (MASANOBU HATANAKA ET AL) 1 November 2001 (2001-11-01) paragraph '0211!; figures 16,17 -----	

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 02/22587

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9946081	A	16-09-1999	WO 9946081 A1	16-09-1999
WO 0002235	A	13-01-2000	WO 0002235 A1	13-01-2000
US 5395801	A	07-03-1995	DE 4434230 A1	30-03-1995
			JP 3032684 B2	17-04-2000
			JP 7153726 A	16-06-1995
US 6114249	A	05-09-2000	JP 3207178 B2	10-09-2001
			JP 11330025 A	30-11-1999
			TW 442560 B	23-06-2001
EP 1068928	A	17-01-2001	EP 1068928 A2	17-01-2001
			JP 2000301454 A	31-10-2000
			KR 2000058021 A	25-09-2000
			SG 87886 A1	16-04-2002
			TW 457168 B	01-10-2001
			US 6435942 B1	20-08-2002
JP 2000068371	A	03-03-2000	US 2002168857 A1	14-11-2002
			US 2002119662 A1	29-08-2002
EP 1061111	A	20-12-2000	EP 1061111 A1	20-12-2000
			US 6436835 B1	20-08-2002
			WO 9943761 A1	02-09-1999
			US 2002045350 A1	18-04-2002
US 5981394	A	09-11-1999	JP 3265199 B2	11-03-2002
			JP 10106983 A	24-04-1998
			TW 410395 B	01-11-2000
JP 2000156360	A	06-06-2000	KR 2000006580 A	25-01-2000
			TW 418459 B	11-01-2001
			US 2001036738 A1	01-11-2001